CHAPTER 1. INTRODUCTION

The management of spent nuclear fuel (SNF) has been an integral part of the mission of the Savannah River Site (SRS) for more than 40 years. Until the early 1990s, SNF management consisted primarily of short-term onsite storage and processing in the SRS chemical separation facilities to produce strategic nuclear materials.

With the end of the Cold War, the U.S. Department of Energy (DOE) decided to phase out processing of SNF for the production of nuclear weapons materials (DOE 1992). Therefore, the management strategy for this fuel has shifted from short-term storage and processing for the recovery of highly-enriched uranium and transuranic isotopes to stabilization, when necessary, and storage pending final disposition that includes preparing aluminum-based SNF for placement in any potential geologic repository. In addition to the fuel already onsite, the SRS will receive SNF from foreign research reactors until 2009 and from domestic research reactors until, potentially, 2035. As a result, the safe and efficient management of SNF will continue to be an important SRS mission.

This EIS evaluates the potential environmental impacts of DOE’s proposed plans for managing SNF assigned to SRS.

1.1 Background

1.1.1 HISTORIC MISSIONS

The U.S. Atomic Energy Commission, a DOE predecessor agency, established the SRS in the early 1950s. The Site occupies an area of approximately 300 square miles (800 square kilometers) adjacent to the Savannah River, primarily in Aiken and Barnwell Counties in South Carolina. It is approximately 25 miles (40 kilometers) southeast of Augusta, Georgia, and 20 miles (32 kilometers) south of Aiken, South Carolina (Figure 1-1).

For the past 40 years the SRS mission has been the production of special radioactive isotopes to support national programs. Historically, the primary Site mission was the production of strategic isotopes (plutonium-239 and tritium) for use in the development and production of nuclear weapons. The SRS produced other isotopes (e.g., californium-252, plutonium-238, americium-241) to support research in nuclear medicine, space exploration, and commercial applications. DOE produced these isotopes in the five SRS production reactors. After the material was produced at the SRS, it was shipped to other DOE sites for fabrication into desired forms.

1.1.2 FUEL CYCLE

The material in the SRS reactors consisted of nuclear fuel and targets. The nuclear fuel was enriched uranium that was alloyed with aluminum and then clad with aluminum. The targets were either oxides or metallic forms of various isotopes such as neptunium-237 or uranium-238 that were clad with aluminum. Fuel and targets were fabricated at the SRS and placed in the reactors, and then the reactors operated to create the neutrons necessary to transmute the target material. For example, neptunium-237 targets were irradiated to produce plutonium-238, a material used by the National Aeronautics and Space Administration as a power source for deep space probes. After irradiation, the fuel and targets (collectively referred to as spent nuclear fuel) were removed from the reactors and placed in water-filled basins for short-term storage, about 12 to 18 months, before they were processed in the SRS separations facilities. Figure 1-2 shows the historic fuel and target cycle.

During processing, SNF was chemically dissolved in F or H Canyon to recover the uranium and transuranic isotopes. The recovered material was used in nuclear weapons programs or

Figure 1-1. Location of the Savannah River Site.

Figure 1-2. Historic nuclear materials production cycle at the Savannah River Site.

for commercial applications. The remaining residue from the fuel, high-level radioactive waste consisting primarily of fission products and cladding in liquid form, was transferred to large steel tanks for storage. The high-level waste is currently being vitrified in the Defense Waste Processing Facility at the SRS to prepare it for disposal in any potential geologic repository.

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1.1.3 CHANGING MISSIONS

With the end of the Cold War there was a decreased need for the strategic nuclear material that was produced at the SRS. In 1992, the Secretary of Energy directed that processing operations be phased out throughout the DOE complex, effectively halting the SRS mission to produce strategic nuclear materials such as plutonium-239. However, SNF and targets from previous production reactor irradiation cycles remained in storage at K-, L-, C-, and P-Reactor Disassembly Basins. (Chapter 2 describes SRS SNF storage facilities.)

In addition to nuclear material production missions, another mission for the SRS was (and continues to be) the receipt of SNF from DOE, domestic, and foreign research reactors. These reactors were operated by DOE, universities, and research institutions for educational and research purposes and to produce isotopes for nuclear medicine. Historically, SNF from these reactors was stored in the Receiving Basin for Offsite Fuel at SRS. In the past, much of the research reactor SNF was processed in the same manner as spent fuel from SRS production reactors. However, with the end of the Site's strategic nuclear materials production mission, SNF from research reactors has been accumulating in the Receiving Basin for Offsite Fuel and in the L-Reactor Disassembly Basin.

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Some of the research reactor spent nuclear fuel sent to SRS was not aluminum based. Because DOE did not have the capability to process that type of SNF at SRS, it was placed in wet storage at the Receiving Basin for Offsite Fuel, where it remains in storage.

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By 1995 DOE was storing about 195 metric tons heavy metal (MTHM [metric tons heavy metal] – the mass of uranium in the fuel or targets, excluding cladding, alloy materials, and structural materials) – of aluminum-based SNF in the SRS reactor disassembly basins and the Receiving Basin for Offsite Fuel. DOE also was storing about 20 MTHM of non-aluminum-based SNF in the Receiving Basin for Offsite Fuel.

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1.1.4 STABILIZATION

DOE has taken action to stabilize about 175 MTHM of the 195 MTHM of aluminum-based SNF that was in storage at SRS in 1995. DOE decided to stabilize this material following completion of the *Interim Management of Nuclear Materials Environmental Impact Statement* (DOE 1995a). The primary purpose of the actions described in that environmental impact statement (EIS) was to correct or eliminate potential health and safety vulnerabilities related to some of the methods used to store nuclear materials (including SNF) at SRS. The vulnerable SNF had been stored in wet storage basins with poor water quality. The poor water quality resulted in corrosion and failure of the cladding on the fuel and subsequent releases of radioactive fission products to the water of the storage basins. In 1996, SRS began stabilizing vulnerable aluminum-based uranium metal SNF in F Canyon. That work is complete. Vulnerable aluminum-based SNF still is being stabilized in H Canyon and that work is expected to continue through 2002. In the *Interim Management of Nuclear Materials EIS* (DOE 1995a), DOE identified 20 MTHM (out of 195 MTHM) of aluminum-based SNF at SRS that was "stable," i.e., that likely could be safely stored for about 10 more years, pending decisions on final disposition. That 20 MTHM of aluminum-based SNF is included in this EIS.

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1.1.5 SPENT NUCLEAR FUEL CONSOLIDATION

In May 1995, DOE decided (60 FR 28680) under the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental*

Restoration and Waste Management Programs Final Environmental Impact Statement to consolidate existing and newly generated SNF at three existing Departmental sites based on the fuel type, pending future decisions on ultimate disposition. Specifically, DOE decided that existing Hanford production reactor fuel would remain at Hanford, aluminum-based SNF (excluding the aluminum-based SNF at Hanford) would be consolidated at SRS, and non-aluminum-based SNF would be consolidated at the Idaho National Engineering and Environmental Laboratory (INEEL). DOE stated that decisions on preparing the SNF for final disposition would be made under site-specific National Environmental Policy Act evaluations. As a result of DOE's decision to consolidate SNF storage, DOE will transfer 20 MTHM of non-aluminum-based SNF from SRS to INEEL and will transfer about 5 MTHM of aluminum-based SNF at INEEL to SRS. DOE estimates these transfers could begin about 2009 and may be completed by 2017. Thus, the non-aluminum-based SNF at SRS and the aluminum-based SNF from INEEL that will be transferred to the SRS are included in this EIS. Additionally, as a result of the consolidation decision DOE reached under the *Programmatic Spent Nuclear Fuel Management and Idaho mental Restoration and Waste Management Programs Environmental Impact Statement* (DOE 1995b), SRS could receive about 5 MTHM of aluminum-based SNF from domestic research reactors. Shipments from domestic research reactors could continue through 2035. Material expected to be received from domestic research reactors is included in this EIS.

In May 1996, DOE announced a decision (61 FR 25092) under the *Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel* (Nonproliferation Policy and Spent Fuel EIS) to accept about 18 MTHM of aluminum-based SNF containing uranium of United States origin from foreign research reactors for management in the United States at the SRS. The receipt of foreign research reactor SNF at SRS is now underway and receipts are scheduled to be completed by 2009. The 18 MTHM of foreign research reactor SNF that could be received at SRS is included in the scope of this EIS. (Recent decisions by some foreign research reactor operators have reduced the quantity of SNF expected to be shipped to SRS from about 18 MTHM to about 14 MTHM; however, the 18 MTHM projection is used for analysis purposes in this EIS because foreign research reactor operators still have the option to ship to the United States.)

1.1.6 PREPARATION FOR DISPOSITION

In summary, the total quantity of aluminum-based SNF at SRS that must be managed and prepared for disposition is as follows: 20 MTHM in existing SRS wet storage basins; about 10 MTHM to be received from INEEL and domestic research reactors; and about 18 MTHM to be received from foreign research reactors. Additionally, SRS must manage about 20 MTHM of non-aluminum-based SNF until it is transferred to INEEL.

1.2 Purpose and Need for Action

DOE anticipates placing most of its aluminum-based SNF inventory in a geologic repository after treatment or repackaging. However, DOE does not expect any geologic repository to be available until at least 2010 and shipments from DOE sites would not begin until about 2015. Until a repository is available, the Department intends to develop and implement a safe and efficient SNF management strategy that includes preparing aluminum-based SNF stored at SRS or expected to be shipped to SRS for disposition offsite. DOE is committed to avoiding indefinite storage at the SRS of this nuclear fuel in a form that is unsuitable for final disposition. Therefore, DOE needs to identify management technologies and facilities for storing and treating this SNF in preparation for final disposition.

1.3 Scope

This EIS evaluates potential environmental impacts from managing SNF that currently is located or expected to be located at SRS. The evaluation includes impacts from the construction and operation of facilities (either new or modified existing facilities) that would be used to receive, store, treat, and package SNF in preparation for ultimate disposition. Onsite transportation impacts are considered, however, no impacts associated with transporting SNF to SRS are included, because these impacts have been covered in other EISs. The potential impacts of transporting SNF to a geologic repository are discussed (in Chapter 4) for completeness but no decisions related to transporting SNF offsite will be made under this EIS. Transportation of SNF (and high-level waste) to a federal repository will be addressed in the EIS for a federal repository (see Section 1.6). The Yucca Mountain EIS is being prepared as part of the process to determine whether to recommend the Yucca Mountain site as the site of the Nation's first geologic repository for SNF and high-level radioactive waste.

In this EIS, DOE is evaluating the management of about 48 MTHM of aluminum-based SNF for treatment and storage (20 MTHM of aluminum-based SNF stored at SRS and about 28 MTHM of aluminum-based SNF from foreign and domestic research reactors that could be shipped to SRS until 2009 and from domestic research reactors that could be shipped to SRS until 2035).

DOE also evaluates transferring 20 MTHM of non-aluminum-clad spent nuclear fuel currently stored in the Receiving Basin for Offsite Fuel at SRS to a new dry storage facility at SRS. This transfer would occur only if a dry storage facility were built as part of the implementation of a new treatment technology to prepare aluminum-based spent nuclear fuel for disposition (potential technologies are discussed in Section 2.2) and if the dry storage facility became operational before the non-aluminum-clad fuel was transferred to the INEEL. The transfer to dry storage would occur after the fuel had been relocated from the Receiving Basin for Offsite Fuel to the L-Reactor Disassembly Basin in support of activities necessary to phase out the use of the Receiving Basin for Offsite Fuel by fiscal year 2007.

This EIS does not evaluate the impacts of managing the non-aluminum-clad fuel at INEEL or of transporting the fuel to INEEL. These impacts were documented in the SNF programmatic EIS (PEIS) (DOE 1995b) and were evaluated as part of the process DOE used to decide to consolidate the storage of non aluminum-clad spent nuclear fuel at the INEEL.

SRS is storing Mark-51 and other targets in the Receiving Basin for Offsite Fuel (RBOF) in the Site's H-Area. This EIS evaluates the impacts of continuing to store the Mark-51 and other targets in RBOF, and evaluates an alternative of transferring them to dry storage to provide flexibility in material management operations.

DOE is evaluating potential uses for this material and the operations and facilities that would be necessary. The Mark-51 and other targets (described in Section 1.5 of this EIS) contain americium and curium isotopes that could be used to produce elements with higher atomic numbers such as californium-252. Californium-252 is used as a neutron source for radiography and in the treatment of certain types of cancer and for research in basic chemistry, nuclear physics, and solid-state chemistry. If DOE were to determine that a programmatic need for this material exists, the targets would continue to be stored at the SRS pending preparations to ship them to another DOE facility where isotope production capability currently exists or could be constructed and operated. SRS does not have isotope production capability.

This EIS does not evaluate the impacts of utilizing target material for programmatic purposes such as production of californium. DOE would perform the appropriate National Environmental Policy Act review to evaluate the impacts of shipment of the targets to an isotope production facility and of construction (or modification) and operation of the production facility, should such a programmatic purpose be identified.

DOE is storing the Mark-18 targets in wet basins at the SRS. These targets are similar to the Mark-51 and other targets in that they contain

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americium and curium that could be used to produce elements with higher atomic numbers such as californium-252. They are different from the small (about two feet in length) Mark-51 and other targets because the Mark 18s are about 12 feet long and therefore have different requirements for storage, transportation and use. As is the case with the Mark-51 and other targets, DOE is not proposing any actions that would lead to programmatic use of the Mark-18 targets at this time. Because of their length, the Mark-18 targets would have to be reduced in size for use in production facilities at another DOE facility or transfer to dry storage at the SRS. This EIS considers only continued wet storage of Mark-18 targets. However, the Interim Management of Nuclear Materials EIS (which is incorporated herein by reference) considered the alternative of processing the Mark-18 targets in the SRS canyons, should they present potential health and safety vulnerabilities. See Section 1.5 of this EIS for more information.

1.4 Decisions to be Based on this EIS

DOE expects to make the following decisions on the management and preparation of SNF for storage and ultimate disposition.

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- The selection of the appropriate treatment or packaging technologies to prepare aluminum-based SNF that is to be managed at SRS.

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EC

- Whether DOE should construct new facilities or use existing facilities to store and treat, or package aluminum-based SNF that is expected to be managed at SRS.

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- Whether DOE should repackage and dry-store stainless-steel and zirconium-clad SNF pending shipment to the Idaho National Engineering and Environmental Laboratory.

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EC

- Whether DOE should repackage and dry-store Mark-51s and other americium/curium targets in the event dry-storage capability becomes available at SRS.

1.5 Spent Nuclear Fuel Groups

This section introduces the basic terminology for describing SNF and provides more information on the approximately 68 MTHM of SNF subject to analysis in this EIS.

DOE has categorized the spent fuel considered in this EIS into six groups (Group A through Group F). The categorization is based on such characteristics as fuel size, physical or chemical properties, or radionuclide inventories. DOE grouped the fuel to distinguish how it could apply the management alternatives evaluated in the EIS (Section 2.2). Table 1-1 lists the fuel groups and the amount of fuel in each group. Appendix C provides more detailed information regarding fuel types, quantities, locations, radionuclide inventories, and curie content.

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The aluminum-based fuels currently stored at SRS include some fuels that were not originally aluminum-clad (EBR-II and Sodium Breeder Experimental Reactor Fuel). Additionally, the aluminum-based category consists of one element not yet received but due to be shipped to SRS (the Advanced Reactivity Measurement Facility Core Filter Block). Most of the fuels that were not originally aluminum-clad (but are included under this EIS's major category of aluminum-based fuel) have been declad and placed in aluminum cans. In their present form they can be processed at the SRS through the existing technologies on site. Other fuels at SRS which are non-aluminum-clad fuels cannot be processed in their existing form using the existing technologies and are characterized in this EIS as non-aluminum-based fuel. The Core Filter Block is included under the category of

Table 1-1. Spent nuclear fuel groups.

Fuel group	Volume (MTRE)[a]	Mass (MTHM)[b]	
A. Uranium and Thorium Metal Fuels	610	19	EC
B. Material Test Reactor-Like Fuels	30,800	20	TC
C. HEU/LEU[c] Oxides and Silicides Requiring Resizing or Special Packaging	470[d]	8	
D. Loose Uranium Oxide in Cans	NA	0.7	
E. Higher Actinide Targets	NA	<0.1	TC
F. Non-Aluminum-Clad Fuels[e]	1,900	20.4	
Total	33,780	68.2	

NA = Not applicable

a. MTRE = Materials test reactor equivalent. An MTRE is a qualitative estimate of SNF volume that provides information on the amount of space needed for storage. An MTRE of Materials Test Reactor-Like Fuels would usually be one fuel assembly measuring about 3 inches by 3 inches by 2 feet long. EC

b. MTHM = Metric tons of heavy metal.

c. HEU = highly enriched uranium; LEU = low enriched uranium.

d. Fuel group also includes about 2,800 pins, pin bundles, and pin assemblies.

e. This fuel group will be shipped to Idaho National Engineering and Environmental Laboratory. It will not be treated at SRS. TC

TC aluminum-based fuel since the most practical way of dealing with it (based on its unique configuration) is to process it utilizing the existing technology at SRS.

Uranium and Thorium Metal Fuels (Group A):

This group consists of fuels from the Experimental Breeder Reactor-II and the Sodium Reactor Experiment, as well as a core filter block from the Advanced Reactivity Measurement Facility at INEEL (that is scheduled to be transferred to SRS). This group also includes unirradiated Mark-42 targets that were manufactured from plutonium oxide-aluminum powder metal and formed into tubes that were clad with aluminum

The Experimental Breeder Reactor-II fuel and Sodium Reactor Experiment fuel are uranium metal that has been declad and stored in canisters in the Receiving Basin for Offsite Fuel. The declad fuel presents a potential health and safety vulnerability. These fuels have cores of reactive metals that were exposed when the fuel cladding was removed. Any contact of the reactive metal core with water would lead to relatively rapid oxidation of the core and disintegration of the fuel. Should the existing storage containers leak, the metal fuel would corrode and release fission products to the water of the storage basin. Once the metal of the fuel is wetted, simply repackaging the fuel in a watertight container would not arrest the corrosion and, in fact, could exacerbate storage concerns since potentially explosive hydrogen gas would continue to be generated inside the storage canister as the fuel continued to corrode. Water intrusion and subsequent fuel corrosion has already occurred with one Experimental Breeder Reactor-II canister stored in the Receiving Basin for Offsite Fuel. That material was processed in F Canyon to eliminate the problem. L2-5 In the event that leaks were detected in any additional canisters prior to processing/treatment in accordance with decisions reached under this EIS, DOE would process those canisters in an SRS canyon facility. EC This management approach is consistent with the Records of Decision reached under the *Interim Management of Nuclear Materials Final Environmental Impact Statement* for other uranium metal SNF stored in the Receiving Basin for Offsite Fuel at the SRS. The *Interim Management of Nuclear Materials EIS* deferred decisions on the materials that did not pose immediate health and safety vulnerabilities because they were considered to be stable for 10 years and DOE wanted to provide the public an opportunity to comment as part of the overall planning for SNF at SRS.

The unirradiated Mark-42 targets were manufactured from plutonium oxide-aluminum powder metal and formed into tubes that were clad with aluminum. The plutonium oxide and aluminum were pressed together in the manufacturing process. As a result, the unirradiated targets are less durable than uranium-aluminum alloy SNF because of the particulate nature of the plutonium oxide but more durable (i.e., less reactive) than uranium metal SNF since the plutonium is already in oxide form. The unirradiated Mark-42 targets present a potential safety and health vulnerability in that should the cladding of these targets be breached, the plutonium oxide could migrate to the water of the storage basin.

The core filter block at INEEL is made of depleted uranium and was used as a neutron "filter" for reactivity experiments. As a result, the filter was subject to relatively short (or low-power level) exposure times in the test reactor and is only slightly irradiated. The core filter block contains cylindrical sleeves of various corrosion resistant metals at different diameters within the filter block.

EC DOE is unaware of any health or safety concerns related to the core filter block. The core filter block is a unique assembly in that it includes materials that would not be compatible with the melt and dilute process for aluminum-based L2-14 SNF. Additionally, the core filter block is composed mainly of depleted uranium and has been exposed to relatively low power so it contains very little fissile material or fission products. Processing would not extend the time for planned canyon operations, would not generate recovered fissile material, and would produce only a few kilograms of depleted uranium.

EC There is uncertainty regarding the acceptability of the material in this fuel group in its current form into a repository due to the reactive nature of uranium metal or the particulate nature of some of the material. The oxidation or burning of the metal in the repository could cause damage and spread radioactive particles throughout the repository. EC Although somewhat less reactive than pure metals, the uranium and thorium metal fuels discussed in this EIS (Group A) would need special attention to mitigate their reactivity.

This group accounts for approximately 2.0 percent of the volume of aluminum-based fuel that DOE is likely to manage at the SRS from now until 2035. Because the fuel in Group A is made of unalloyed metal (i.e., it contains little or no aluminum), it is more dense than most of the other spent fuel considered in this EIS. As a result, this small volume of fuel contains about 40 percent of the mass of heavy metal.

<u>Materials Test Reactor-Like Fuels (Group B):</u>

This group consists primarily of Materials Test Reactor fuels and other fuels of similar size and composition. Most research reactors – foreign and domestic – use Materials Test Reactor fuel, which has a flat or curved plate design. Figure 1-3 shows a typical Materials Test Reactor fuel assembly. Although these fuels come in a variety of shapes and compositions, the active fuel region is typically about 2 feet (0.6 meter) long and the overall assembly is about 4 feet (1.2 meters) long. The cross-section of an assembly is approximately square, about 3 inches (8 centimeters) on a side.

These fuels vary in enrichment. Approximately TC 70 percent of the Group B assemblies are highly enriched uranium, and the remainder are low enriched uranium. They are uranium-aluminum, uranium oxide-aluminum, or uranium silicide-aluminum alloy; all types are clad with aluminum. Group B accounts for approximately 97 percent of the volume of aluminum-based SNF that DOE will manage at SRS between now and 2035. DOE considers that there are no currently known health and safety vulnerabilities for this material that would preclude wet storage pending the operation of a new treatment technology.

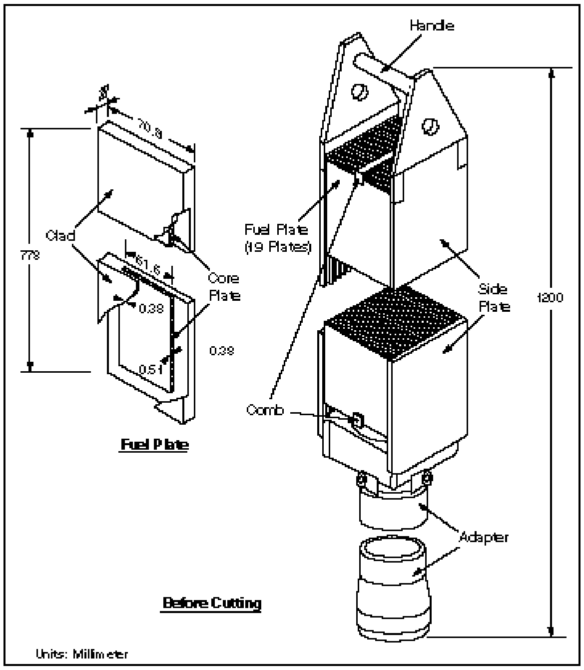

Figure 1-3. Typical Materials Test Reactor fuel assembly.

Although some Group B fuels are stored at SRS in the Receiving Basin for Offsite Fuel or in L Disassembly Basin, at present most are at domestic universities, foreign research reactors, and DOE research facilities pending shipment to the Site. All of the Group B fuels that are currently stored at SRS are "intact." The good condition of the cladding and the durability of the alloyed fuel at SRS provide a high degree of confidence that the fuel will not degrade during storage and that actions to correct potential health and safety vulnerabilities will not be necessary before treatment using the technology that DOE proposes to select under the record of decision from this EIS. DOE expects this will be true for most of the foreign and domestic research reactor SNF included in Group B that is yet to be shipped to SRS. However, if DOE determines that any of the Group B fuel presents a health and safety vulnerability, DOE would evaluate the situation and take appropriate action that could include canning the problem fuel or processing the fuel in one of the SRS canyon facilities. This management approach is consistent with the Record of Decision reached under the *Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel.*

<u>HEU/LEU Oxides and Silicides Requiring Resizing or Special Packaging (Group C):</u>

Fuels in this group are similar in composition to Group B fuels in that they are aluminum-based, highly enriched uranium (HEU) and low enriched uranium (LEU) oxides and silicides, but their size or shape might preclude packaging them in the disposal canisters proposed for use in a repository without resizing or special packaging considerations. Some fuel in this group is smaller in diameter and longer than Group B fuels or is larger than Group B fuels in both diameter and length; it often comes in odd shapes such as a 1.5-foot by 3-foot (0.46-meter by 0.9-meter) cylinder or a sphere with a diameter of 29 inches (74 centimeters). DOE would have to disassemble or use other volume-reduction activities to place such fuels in a nominal 17-inch direct co-disposal canister (see Section 2.2). At present, much of this fuel is at other DOE sites and in other countries but is scheduled to be received at SRS.

DOE expects that most of the fuel in this category is intact and would be managed as described above for Group B fuels. However, a small amount is not intact. That material consists of some fuel and one target that were cut or sectioned for research purposes. After the research was completed, the fuel and target pieces were canned in 14 cans and placed in wet storage. The origin and location of this material is discussed in Appendix C, Table C-3. The sectioned fuel and target present a potential health and safety vulnerability similar to that of the Group A fuel discussed previously. If a storage can were to leak, DOE would address the problem as described for the Group A fuel to prevent the release of fission products and particulate material to the water of a storage basin. Additionally, the current form of the fuel (i.e., failed) may not be acceptable in a repository because its integrity has been compromised.

Together Group B and Group C fuels represent 97 percent of all fuel to be managed at SRS, and 93 percent of the total fuel at SRS (including Group F fuels which will be shipped to Idaho National Engineering and Environmental Laboratory without treatment at SRS).

<u>Loose Uranium Oxide in Cans (Group D):</u>

This group consists of loose uranium oxide with fission products distributed through the material that has been stored in aluminum cans. This material, in its current particulate form, probably would not be acceptable for disposal in a repository because it is not in a tightly bound metal or ceramic matrix. Therefore, this group probably would require special packaging and/or treatment. Group D fuels also include targets in foreign countries that are liquid and that DOE expects would be converted to oxide prior to shipment to SRS. Only about 10 percent of the Group D fuel is in storage at SRS. The rest of the material has yet to be produced via foreign research reactor operations. Although eligible for shipment, most of this fuel is not part of the current shipping plan as projected by foreign research reactor operators.

The Group D fuel currently stored at SRS (676 cans of Sterling Forest Oxide fuel from the former medical isotope – production reactor; see Table C-4) presents a potential health and safety vulnerability similar to that of the Group A fuels. If a storage can leaked, DOE would address the problem as described for the Group A fuels to prevent the release of fission products and particulate matter to the water of an SRS storage basin. Group D comprises approximately 6 percent of the volume of the aluminum-based SNF that DOE could manage at SRS from now until 2035.

<u>Higher Actinide Targets (Group E):</u>

This group contains irradiated and unirradiated target materials used to generate radionuclides with atomic numbers higher than that of uranium. This material could be used to support such national programs as space exploration or medical research. The targets are aluminum-clad plutonium oxide that contain significant quantities of americium and curium, which react under neutron irradiation to produce elements with still higher atomic numbers such as californium. All materials in this group are stored in the Receiving Basin for Offsite Fuel. Group E accounts for less than 1 percent of the volume of aluminum-based SNF DOE could manage at SRS from now until 2035.

The Higher Actinide Target fuel group consists of 60 Mark-51 targets, 114 other targets, and 65 Mark-18 targets. This material was evaluated in the *Final Environmental Impact Statement for Interim Management of Nuclear Materials*, (DOE/EIS-0220) and DOE decided the targets should remain in wet storage. In this EIS, DOE evaluates the continued wet storage of the Mark-51 and other targets pending shipment offsite. DOE also evaluates repackaging the Mark-51 and other targets to place them in a new dry storage facility so that the material could be transferred to dry storage if necessary to provide flexibility in spent fuel storage operations.

The Mark-18 targets are different from the Mark-51 and other targets in several ways. The most important distinction is that each Mark-18 target is one continuous piece about 12 feet long. The Mark-51 and other targets are about 2 feet long. The Mark-51 and other targets could be handled, transported and stored (including in a dry storage facility) in their current configuration. The 12-foot long Mark-18 targets would require size reduction for transport or storage in a dry storage facility. The standard method to reduce the size of the Mark-18 targets would be to cut them up under water in an SRS wet storage basin. The condition of the Mark-18 targets presents a health and safety vulnerability for under water cutting because of the suspected brittle condition of the targets and the uncertainty of the region of the target assemblies that contains the target product (i.e., americium and curium) and fission products. The brittle condition is due to a very long irradiation cycle in a reactor at the SRS. Cutting the targets using the existing site capability could result in the uncontrolled release of radioactive material to the water of the Receiving Basin for Offsite Fuel. For these reasons, a previous DOE assessment of this material (see Section 1.6.2) concluded that the Department should consider processing the Mark-18 targets in F Canyon. Analysis of such alternatives are not included in this EIS because DOE performed that evaluation in the *Final Environmental Impact Statement for Interim Management of Nuclear Materials*, which is incorporated herein by reference. Those alternatives included dissolving the targets in F-Canyon and then vitrifying the americium and curium in a new F-Canyon vitrification facility, dissolving the targets in F-Canyon and recovering the americium and curium as an oxide, and dissolving the targets and transferring the americium and curium to the high-level waste tanks at the SRS.

Non-Aluminum-Clad Fuels (Group F):

This group consists of the large variety of stainless-steel or zirconium-clad SNF at SRS that DOE plans to ship to INEEL in accordance with decisions DOE reached under the SNF PEIS (DOE 1995b).

1.5.1 COMPARISON OF SPENT NUCLEAR FUEL GROUPS

A comment was made regarding the differences between the fuel categories used in this EIS and the EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (i.e., Yucca Mountain EIS). The Notice of Availability of the Yucca Mountain Draft EIS was published on August 13, 1999 (64 FR 44217) and analyzes the options being considered for siting of a repository for spent nuclear fuel and high level waste.

Table 1-2 shows the categories being used in both EISs. The Yucca Mountain categories and MTHM numbers encompass fuel and targets being managed by SRS in preparation for ultimate disposition. Should a repository be developed, that fuel and most targets would be shipped, in one form or another, to the repository for ultimate disposition. Category F fuel will be shipped from SRS to INEEL under the Record of Decision for the Final Programmatic Spent Nuclear Fuel and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs EIS. As such, INEEL will be responsible for determining the ultimate disposition of category F fuel. Therefore, the 20.4 MTHM of non-aluminum clad fuel is not included in the Yucca Mountain categories for SRS managed fuel.

Category A is made up of 17 MTHM EBR-II (matching Yucca Mountain EIS category 1) and 2 MTHM SRE (“Thorium” part). The SRE is contained within Yucca mountain category 16.

Material within groups B and C of the SRS SNF EIS are included in groups 5, 6, and 7 of the Yucca Mountain EIS. Material within groups D & E of the SNF EIS are included in group 16 of the Yucca Mountain EIS. The material is made up of foreign research reactor and domestic research reactor fuel and targets and other target material produced at SRS.

Excluding group F, there is a 4.0 MTHM difference between the totals calculated for the SNF EIS table (47.8 MTHM) and the Yucca Mountain table (43.8 MTHM). The differences are due to recent decisions by some foreign research reactor (FRR) operators which have reduced the quantity of SNF expected to be shipped to SRS. However, the SRS SNF EIS uses the larger projected number because those FRRs still have the option to ship to the United States.

Table 1-2. Comparison of Spent Nuclear Fuel Groups.

NEPA document		Fuel group	Mass (MTHM)[a]
Savannah River Site Spent Nuclear Fuel Management EIS (DOE/EIS-0279)	A	Uranium and Thorium Metal Fuels	19
	B	Material Test Reactor-Like Fuels	20
	C	HEU/LEU Oxides and Silicides Requiring Resizing or Special Packaging	8
			0.7
	D	Loose Uranium Oxide	0.1
	E	Higher Actinide Targets	20.4
	F	Non-Aluminum-Clad Fuels	
Draft EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, NYE County, Nevada (DOE/EIS-0250D)[b]	1	Uranium Metal	17
	5	Uranium Oxide, Failed/ Declad/ Aluminum Clad	3.2
	6	Uranium-Aluminide	8.7
	7	Uranium-Silicide	12
	16	Miscellaneous	2.9

a. MTHM = Metric tons of heavy metal.
b. Includes only Savannah River Site Fuel

TC

1.6 Relevant Documents

1.6.1 NATIONAL ENVIRONMENTAL POLICY ACT DOCUMENTS

Final Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement

DOE prepared this EIS (DOE 1995b) in compliance with a Court Order dated December 22, 1993, in the case of Public Service Company of Colorado v. Andrus, No. 91-0054-5-HLR (D. Idaho). The preferred alternative in the Final EIS, which DOE issued in April 1995, is Regionalization by Fuel Type. Volume 1 of this EIS analyzes at a programmatic level potential environmental impacts over the next 40 years of alternatives related to the transportation, receipt, processing, and storage of DOE-owned SNF. Volume 1 supports programmatic decisions on sites at which DOE will manage various types of SNF.

In the Record of Decision, which selected the preferred alternative for implementation (60 FR 28680), DOE decided to manage its SNF by type (fuel cladding and matrix material) at the Hanford Site, the Idaho National Engineering and Environmental Laboratory, and the SRS. Section C.1.2 in Appendix C of this SRS SNF Management EIS discusses its relationship to the programmatic SNF EIS.

An amendment to the Record of Decision (61 FR 9441) reflects the October 16, 1995, Settlement Agreement between DOE, the State of Idaho, and the Department of the Navy by reducing the number of proposed spent fuel shipments to Idaho.

Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor SNF

This EIS (DOE 1996a) analyzes the management of foreign research reactor SNF that contains uranium originally produced or enriched in the United States. It also analyzes appropriate ways to manage such fuel received in the United States, amounts of fuel, shippers, periods of time over which DOE would manage the fuel, modes of transportation, and ownership of the fuel. In EC its Record of Decision (61 FR 25091), DOE stated it would accept from 41 listed countries aluminum-based spent fuel, Training Research Isotope General Atomic (TRIGA) spent fuel, and target material containing uranium enriched in the United States.

EC

Over the life of the foreign research reactor SNF acceptance program, DOE could accept approximately 19.2 MTHM of foreign research reactor SNF in as many as 22,700 separate elements and approximately 0.6 MTHM of target material. Most of the fuel will arrive through the Charleston Naval Weapons Station in South Carolina (about 80 percent), with a very limited amount arriving through the Concord Naval Weapons Station in California (about 5 percent). Most of the target material and some of the fuel (about 15 percent) will arrive overland from Canada. Shipments through Charleston began in September 1996 and those through Concord began in July 1998.

TC

After a limited period of storage, DOE will process and package the fuel as necessary at the SRS and the Idaho National Engineering and Environmental Laboratory to prepare it for disposal in a geologic repository. Section C.1.2 in Appendix C explains the relationship of the Foreign Research Reactor SNF EIS to this EIS.

Final Environmental Impact Statement Interim Management of Nuclear Materials

This EIS (DOE 1995a) evaluates actions to stabilize SRS materials that represent environmental, safety, and health vulnerabilities in their current storage condition or that might represent a vulnerability within the next 10 years.

EC

DOE has published four decisions under this EIS. In the first (60 FR 65300), DOE decided to process plutonium-242 solutions to oxide; vitrify americium and curium solutions to glass; blend highly-enriched uranium solutions down to low enrichment; process the plutonium in Mark-31 target slugs; process plutonium and uranium material in vaults to metal, oxide, or glass, if necessary; and process failed Taiwan Research Reactor SNF and a failed canister of Experimental Breeder Reactor-II SNF.

L2-5

DOE decided that processing the EBR-II fuel in unbreached canisters was not immediately necessary. EBR-II fuel is declad and reactive, but only when it is in contact with water. The fuel inside a storage canister will not corrode as long as the canister retains its integrity. A monitoring and inspection program is in place that would detect any change in the integrity of the storage canisters. Any canisters that failed would be detected and the fuel then processed under the provisions of the Record of Decision to stabilize the material. This monitoring and inspection program applies as well to other fuel types in storage.

In the first supplement to the Record of Decision (61 FR 6633), DOE decided to stabilize Mark-16 and -22 fuels by processing them in the SRS canyons and blending the resulting highly enriched uranium down to low enriched uranium; and to stabilize “other aluminum-clad targets” by dissolving them in the canyons. DOE will transfer the resulting nuclear material from the targets to the SRS high-level waste tanks for vitrification in the Defense Waste Processing Facility.

The second supplement to the Record of Decision (61 FR 48474) contains decisions on vitrifying neptunium-237 solutions, and on the stabilization of plutonium-239 solutions by converting them to a metal using the F and H Canyons and FB-Line.

In the third supplement to the Record of Decision (62 FR 17790), DOE decided to use the F Canyon and FB-Line to stabilize the remaining Taiwan Research Reactor SNF in the Receiving Basin for Offsite Fuel. These actions are relevant to the cumulative impacts assessment in this EIS (see Chapter 5).

Disposition of Surplus Highly Enriched Uranium Environmental Impact Statement

TC

DOE prepared this EIS (DOE 1996b) because of the need to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe manner by reducing stockpiles of weapons-usable fissle materials, setting a non-proliferation example for other nations, and allowing peaceful, beneficial use of the material to the extent practical.

TC

In the Record of Decision (61 FR 40619), DOE stated it would implement a program that will gradually blend as much as 85 percent of the surplus highly enriched uranium to a uranium-235 enrichment level of approximately 4 percent, and will blend the remaining surplus highly enriched uranium down to an enrichment level of about 0.9 percent for disposal as low-level waste. This will occur over 15 to 20 years. DOE could use different technologies at four potential blending facilities, including SRS and the Oak Ridge Reservation. Blending down of highly-enriched uranium would affect SRS operations and waste generation. This activity is relevant to the assessment of cumulative impacts (see Chapter 5).

Storage And Disposition Of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement

DOE prepared this programmatic EIS (DOE 1996c) to evaluate a safe and secure strategy for the long-term storage of weapons-usable fissile materials, primarily plutonium-239 and highly enriched uranium, and the disposition of weapons-usable plutonium that was surplus to national defense needs. This EIS included the SRS inventory of plutonium-239, highly enriched uranium, and other weapons-usable materials.

The Record of Decision (62 FR 3014) specified that DOE will expand or upgrade SRS facilities (i.e., the Actinide Packaging and Storage Facility) to consolidate weapons-usable plutonium, and will move plutonium pits now stored at the Rocky Flats Environmental Technology Site in Colorado to the Pantex Plant in Texas and non-pit plutonium materials to SRS. DOE will ship the non-pit plutonium to SRS only if a subsequent decision calls for the immobilization of plutonium at the Site. The DOE disposition strategy enables the immobilization of surplus plutonium in glass or ceramic material for disposal in a geologic repository, and the burning of some surplus plutonium as mixed oxide fuel in domestic commercial reactors with subsequent disposal of the spent fuel in a geologic repository in accordance with the Nuclear Waste Policy Act.

TC

DOE specified that it will determine the exact locations for disposition of these materials in site-specific EISs and in cost, technical, and nonproliferation studies. However, DOE has decided that it will locate a vitrification or immobilization facility (with a plutonium conversion facility) at either the Hanford Site in Washington or SRS, and that SRS is a candidate site for a potential mixed oxide fuel fabrication facility and a pit disassembly and conversion facility. The implementation of these decisions will require several years. The Programmatic Weapons-Usable Fissile Materials EIS is also relevant in the assessment of cumulative impacts that could occur at the SRS (see Chapter 5).

The Department issued an Amended Record of Decision (63 FR 43386) to the environmental impact statement, *Storage and Disposition of Weapons-Usable Fissile Materials*, on August 6, 1998. In order to support the early closure of the Rocky Flats Environmental Technology Site (RFETS) and the early deactivation of plutonium storage facilities at the Hanford Site, DOE modified, contingent upon the satisfaction of certain conditions, some of the decisions made in its Storage and Disposition ROD associated with surplus plutonium storage pending disposition. Namely, DOE will take steps that allow: (1) the accelerated shipment of all non-pit surplus weapons-usable plutonium from the RFETS (about 7 metric tons) to the SRS beginning in about 2000, in advance of completion of the Actinide Packaging and Storage Facility in 2001, and (2) relocation of all Hanford surplus weapons-usable plutonium (about 6.4 metric tons) to the SRS, between about 2002 and 2005, pending disposition. However, consistent with the Storage and Disposition PEIS ROD, DOE will only implement the movement of the RFETS and Hanford plutonium inventories to the SRS if the

TC

SRS is selected as the immobilization disposition site. DOE is preparing the *Surplus Plutonium Disposition EIS*, draft issued July 1998, as part of the decision-making process for determining the immobilization site. The action described in this EIS is relevant in the assessment of cumulative impacts that could occur at SRS (see Chapter 5).

Final Defense Waste Processing Facility Supplemental Environmental Impact Statement

DOE prepared a Supplemental EIS to examine the impacts of completing construction and operating the Defense Waste Processing Facility at the SRS. This document (DOE 1994) assisted the Department in deciding whether and how to proceed with the Defense Waste Processing Facility project, given the changes to processes and facilities that had occurred since 1982, when it issued the original Defense Waste Processing Facility EIS. The Record of Decision (60 FR 18589) announced that DOE would complete the construction and startup testing of the Defense Waste Processing Facility, and would operate the facility using the In-Tank Precipitation process after the satisfactory completion of startup tests.

The alternatives evaluated in this EIS on the management of SNF could generate radioactive waste that DOE would have to handle or treat at facilities described in the Defense Waste Processing Facility Supplemental EIS and the SRS Waste Management EIS (see next paragraph). The Defense Waste Processing Facility Supplemental EIS is also relevant to the assessment of cumulative impacts (see Chapter 5) that could occur at SRS.

Savannah River Site Waste Management Final Environmental Impact Statement

DOE issued the SRS Waste Management EIS (DOE 1995c) to provide a basis for the selection of a sitewide approach to managing present and future (through 2024) wastes generated at SRS. These wastes would come from ongoing operations and potential actions, new missions, environmental restoration, and decontamination and decommissioning programs.

The SRS Waste Management EIS includes the treatment of wastewater discharges in the Effluent Treatment Facility, F- and H-Area tank operations and waste removal, and construction and operation of a replacement high-level waste evaporator in the H-Area tank farm. In addition, it evaluates the Consolidated Incineration Facility for the treatment of mixed waste. The Record of Decision (60 FR 55249) stated that DOE will configure its waste management system according to the moderate treatment alternative described in the EIS. The SRS Waste Management EIS is relevant to this SNF Management EIS because it evaluates management alternatives for various types of waste that actions proposed in this EIS could generate. The Waste Management EIS is also relevant in the assessment of cumulative impacts that could occur at the SRS (see Chapter 5).

Environmental Impact Statement for a Geologic Repository for the Disposal of SNF and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada

On August 13, 1999, DOE announced the availability (64 FR 44200) of a draft environmental impact statement for a geologic repository at Yucca Mountain for the disposal of SNF and high-level radioactive waste, in accordance with the Nuclear Waste Policy Act of 1982. The DEIS evaluates site-specific environmental impacts from the construction, operation, and closure of the repository. It also evaluates reasonable alternatives for implementing such a proposal, and transportation-related impacts for shipments from across the United States. The DEIS also evaluates the consequences at SRS of continued SNF and high-level waste management assuming the repository is not constructed and operated. The repository decision will affect the ultimate disposal of SNF from SRS. The Final EIS is scheduled to be completed in Fiscal Year 2001.

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Treatment and Management of Sodium-Bonded Spent Nuclear Fuel Environmental Impact Statement

DOE has published a draft environmental impact statement for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel (64 FR 8553 2/22/99). Alternatives to processing at the Idaho National Engineering and Environmental Laboratory (INEEL) include the use of the Plutonium-Uranium Extraction (PUREX) solvent extraction method currently in use at SRS and the melt and dilute technology that is being proposed under this EIS. The technologies would be applied to sodium-bonded spent nuclear fuel blanket assemblies, which are currently in storage at INEEL. L2-16 There is approximately 22.4 MTHM of Experimental Breeder Reactor-II (EBR-II) blanket fuel and 34.2 MTHM of Fermi-1 blanket fuel to be processed. This EIS includes cumulative impacts of sodium-bonded spent nuclear fuel processing at the SRS based on estimates from conventional processing of Fuel Group A. Fuel Group A is mostly EBR-II fuel (16.7 MTHM out of 19 MTHM) and therefore provides a good basis for estimating impacts from processing of similar material at SRS. DOE estimates that the impacts for conventional processing would be sufficiently representative of impacts from melt and dilute for the purpose of presenting cumulative impacts.

Management of Certain Plutonium Residues and Scrub Alloy at the Rocky Flats Environmental Technology Site Final Environmental Impact Statement

In August 1998, the Department issued the Final EIS (DOE 1998a). In this EIS DOE proposed to process certain plutonium-bearing materials being stored at the Rocky Flats Environmental Technology Site (Rocky Flats) located near Golden, Colorado. These materials are plutonium residues and scrub alloy remaining from nuclear weapons manufacturing operations formerly conducted by DOE at that site. In their present forms, these materials cannot be disposed of or otherwise dispositioned because they contain plutonium in concentrations exceeding DOE safeguards termination requirements.

DOE has decided to ship approximately 7,450 pounds of sand, slag and crucible and plutonium fluoride residues (containing approximately 600 pounds of plutonium) and approximately 1,543 pounds of scrub alloy (containing L2-16 approximately 440 pounds of plutonium) to SRS where these materials will be stabilized in F Canyon by chemically separating the plutonium from the remaining materials in the residues and scrub alloy. The separated plutonium will be placed in safe and secure storage, along with a larger quantity of plutonium already in storage at the Savannah River Site, until DOE has completed the *Surplus Plutonium Disposition Environmental Impact Statement* and made final decisions on the disposition of the separated plutonium. Transuranic wastes generated during the chemical separations will be sent to the Waste Isolation Pilot Plant for disposal. Other wastes generated during the chemical separations operations will be disposed of in accordance with the Savannah River Site's normal procedures for disposing of such wastes. The actions will occur between 1998 and 2002.

***Final Environmental Impact Statement Accelerator Production of Tritium at Savannah River Site* (DOE, 1998b)** EC

DOE has proposed an accelerator design (using helium-3 target blanket material) and an alternate accelerator design (using lithium-6 target blanket material). If an accelerator is built, it would be located at SRS. In the Record of Decision DOE decided to use an existing commercial light-water TC reactor as the new tritium source. Therefore, the accelerator will not be built at SRS and impacts from construction and operation are not included in the cumulative impacts section of this EIS.

***Final Environmental Impact Statement for the Construction and Operation of a Tritium Extraction Facility at the Savannah River Site* (DOE 1998c)** EC EC

As stated in the Record of Decision (64 FR 26369; 5/14/99), DOE will construct and operate a Tritium Extraction Facility on SRS to provide the capability to extract tritium from commercial TC light water reactor targets and targets of similar design. The purpose of the proposed action and alternatives evaluated in the EIS is to provide tritium extraction capability to support either accelerator or reactor production. The Tritium Extraction Facility EIS is relevant in the assessment of cumulative impacts that could occur at SRS (see Chapter 5).

EC ***Surplus Plutonium Disposition Final Environmental Impact Statement* (DOE 1999)**

TC This EIS analyzes the activities necessary to implement DOE's disposition strategy for surplus plutonium. Following completion of the EIS, SRS was selected (65.FR 1608) as the location for mixed oxide fuel fabrication and plutonium immobilization facilities that would be used for plutonium disposition, and for the plutonium pit (a component of nuclear weapons) disassembly and conversion facility. The projected impacts of these operations are incorporated in Chapter 5 of this EIS.

1.6.2 OTHER RELEVANT DOCUMENTS

In August 1997, DOE chartered the Nuclear Materials Processing Needs Assessment. The purpose of the assessment was to determine which, if any, additional nuclear materials within the Department of Energy complex may require use of the SRS chemical separations facilities (F or H canyon) for stabilization or preparation for disposition prior to canyon de-commissioning. L15-7 Chemical separations operations are occurring at SRS because DOE is using the canyons to stabilize nuclear materials that represent potential health and safety risks in their current storage configuration. The decisions to use processing capabilities have been documented in a number of Records of Decision, including those following the *F-Canyon Plutonium Solutions EIS*, the *Interim Management of Nuclear Materials EIS*, and the *Rocky Flats Plutonium Residues EIS*. These decisions are consistent with DOE's Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-1, wherein the Board recommended that DOE take steps, including use of the processing facilities, to stabilize nuclear materials that represented health and safety risks. L15-7

The Processing Needs Assessment evaluated four material categories that could require the canyons for stabilization or disposition: spent nuclear fuel, plutonium-239, uranium, and other special isotopes. EC TC The results of the assessment are being reviewed by DOE management to identify needed follow-on actions. EC

Other materials under consideration for processing as SRS canyons include various components currently located at other DOE sites, including Oak Ridge, Rocky Flats, Los Alamos, and Hanford. These materials, which were identified during the Processing Needs Assessment, consist of various plutonium and uranium components. L2-16 If DOE were to process these materials in the SRS separations facilities, additional NEPA reviews would need to be performed. This material has been considered in the cumulative impacts presented in Chapter 5.

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